U.S. Fish and Wildlife Service
All-Terrain Vehicle (ATV)
Torch Operations Guide 2005

Photo taken at Sheldon-Hart Mountain Complex. Polaris Sportsman 500 with Forestry Supply Tank Tank.

Contents

Introduction

The all-terrain vehicle (ATV) torch is a highly specialized and efficient piece of ignition equipment. From the earliest use as basic transportation for a crew member holding a drip torch to its current configuration of an integral power torch mounted on a rear cargo platform, the ATV torch has greatly increased the capability of ground ignition crews. When used properly, the ATV torch can provide access into difficult areas, enhance the speed of ground firing operations, and provide an extra safety factor for ground firing personnel. However, like all specialized equipment, it has definite limitations and is potentially dangerous if the limits are exceeded. Because this equipment is routinely operated under adverse conditions and in a fire environment, special safety considerations are needed. It is important to note that the handling characteristics of an ATV torch can be substantially different from a conventional ATV. Specialized operations and safety training should be required for the ATV torch operator, in addition to basic ATV certification through the Specialty Vehicle Institute of America (SVIA).

This Operations Guide is the result of a revision of a 1996 interagency effort representing the cumulative knowledge and experience of Federal and State agencies that have been instrumental in the development and implementation of the ATV torch as a valuable tool for prescribed burning. The Wildland Fire and Operations Safety Team (WFOST) represented by each region in the FWS prepared this revision for refuge wildland fire management operations.

In response to safety concerns, the team reviewed equipment and safety standards, as well as accident reports from incidents that resulted in loss or damage to equipment and near-miss situations. A common factor in most incidents resulting in the loss of equipment was immobilization of the ATV during firing operations. Two major causes for immobilization were identified:

1. Mechanical failure of the ATV unit itself.
2. Operator judgments that resulted in the ATV getting stuck, high-centered, or otherwise immobilized.

Additional contributing factors included inexperienced or poorly trained operators, careless operation, inappropriate tactics, and excessive operating speeds in rolling, steep, or sandy terrain.

This ATV Torch Operations Guide was developed to identify safety considerations, set minimum and recommended equipment standards. And establish minimum and recommended operational procedures.

The purpose of this guide is to minimize potential hazards and maximize safe operation of the ATV torch. The guide is not meant to supersede any specific agency directives or guides, nor is it meant to endorse any specific products. Instead, the writers hope that it will be adopted in whole or part by service prescribed burning programs to raise the level of operator safety during use of the ATV torch and to help protect our ability to use this valuable piece of equipment.

Attachment 1a STANDARD OPERATING PROCEDURES

Equipment Configuration

Standards and recommendations for configuration of the total torch unit are discussed in this guide.

All-Terrain Vehicle

Attachment 1 ATV REQUIREMENTS
Attachment 1 ATV INSPECTION CHECKLIST (PRE OPERATION)

Refuge wildland fire operations have used Polaris, Honda, and Yamaha ATV's for prescribed burning. Preference seems to vary between individuals. One key factor in this decision may be the ability to get the unit serviced within the local area. Recommendations were made for eight items relating to the ATV itself.

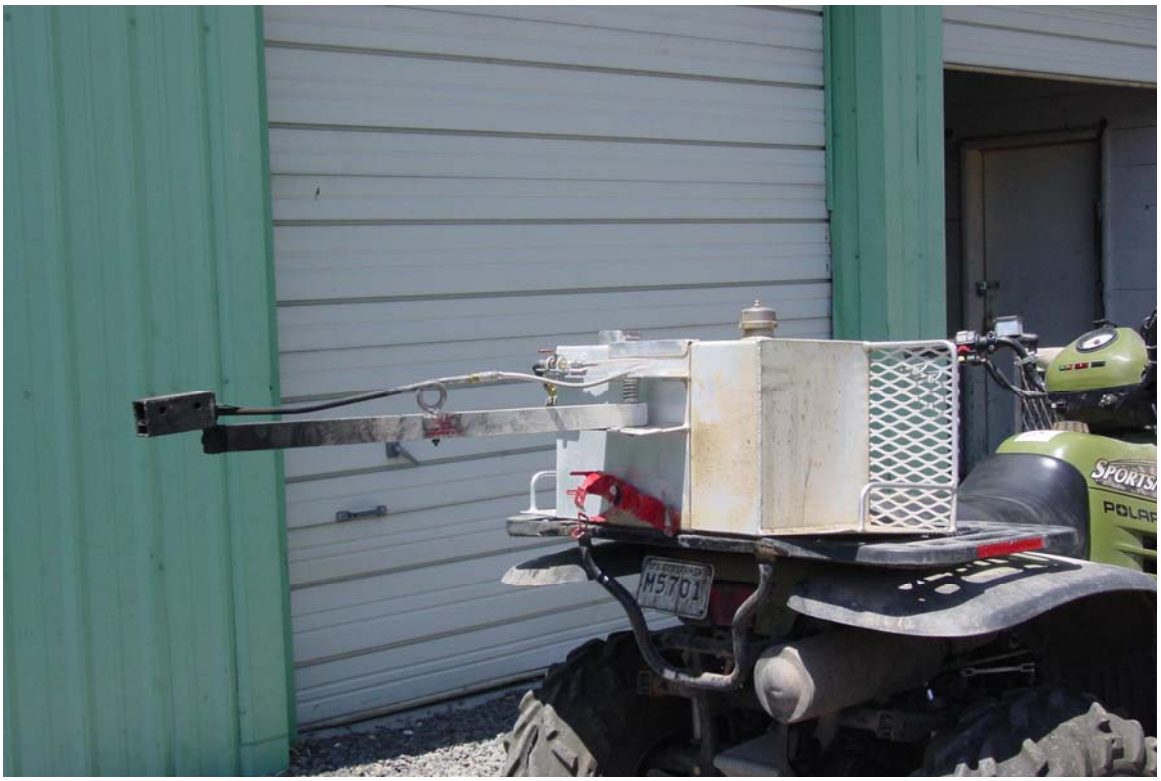
- Engine type. The ATV will be hauling roughly 400 lbs. When purchasing an ATV for drip torch operations the weight restriction for the vehicle should be your key-deciding factor. ATVs ranging from 450cc to 500cc will most often fit the needed requirements. Two cycle engines are not recommended, as they are more difficult to maintain.
- Drive. Shaft drive has commonly been 4X4 or 2X4 with new options on the rise. Terrain, fuel type and job requirements will help determine the particular need. Shaft drives are recommended.
- Tires. Tires should be heavy duty or puncture resistant.
- Cargo racks. Cargo racks should be heavy duty if available, or consideration should be given to installing additional supports.

- Running boards. Running boards are recommended for extra foot protection.
- Hand guards. Hand guards are available on most brands and are recommended but not required. Fuels will dictate the necessity for hand guards.
- Strut brush guards. Strut brush guards are recommended for extra protection of the front axle boots.
- Cooling System. Liquid cooling systems are recommended. They are usually standard on automatic oil injection units. Air-cooled units may be standard on some 4-cycle units. In most cases, air-cooled units will require an auxiliary fan due to the low-speed use of the unit and the exposure to extra heat in the burning environment. When radiators are located in a position that can become punctured or clogged, retrofitting and more frequent inspections are recommended.

Torch Unit

Attachment 1 TORCH REQUIREMENTS

Most torch units used to date have been designed and built by local contractors with input from users. Apparently there are no patents on the equipment, so adaptation to meet local needs is encouraged. An Interagency Team of subject matter experts from the Department of the Interior and USDA Forest Service Missoula Technology and Development Center are evaluating existing equipment in order to establish industry standards. In the interim, purchase of new ATV torch equipment will be prohibited.

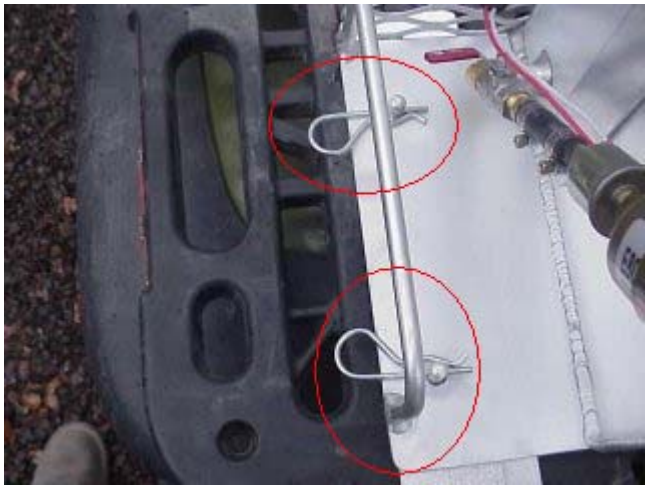


Recommendations were made for seven items relating to the torch unit.

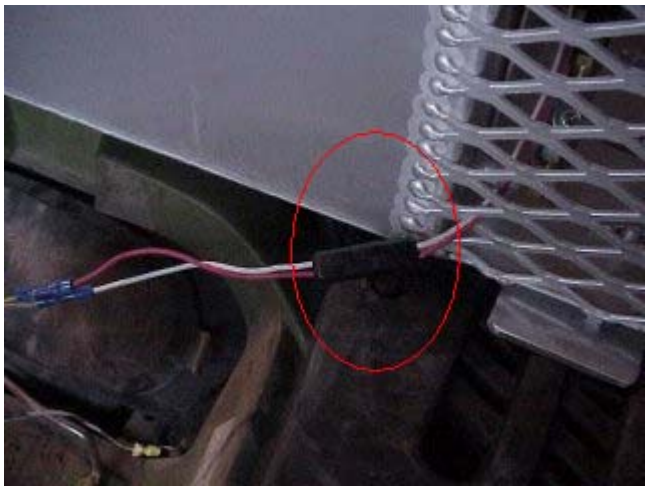
- Fuel tank. A capacity of 6 to 10 gallons is recommended for the fuel tank, depending on the load rating of the ATV. Baffles are recommended inside the tank. Welded aluminum has been the preferred material to date. Baffled fiberglass pesticide tanks may also have some utility.
- Torch arm. A 30-inch long arm mounted on a spring-loaded pivot at the center rear of the unit is recommended. This configuration allows the arm to be used to either side or straight back. Recommended construction of the arm is 1-inch square tubing, with the fuel line mounted on brackets on the top surface of the arm.
- Wick. A conventional drip torch nipple and wick may be used. It is recommended that two wicks be mounted in-line as fuel tends to overshoot a single wick when the regulating valve is wide open.
- Fuel line. A steel braided fuel line is recommended.

Shutoff valve. A shutoff valve between the tank and the fuel line is required in case the fuel line is torn loose.

Pump shutoff. A master cutoff switch will be centrally located up front within easy sight and reach of the operator. Page 7.



- Torch mounting. The tank and torch should be mounted on a base plate that is attached to the ATV cargo rack with a quick-release mechanism.



- Wiring assembly should also have a connection that allows a quick disconnect in case the entire tank must be ejected from the ATV.

- It is recommended that an inline fuse be included on the positive wire before the pump.

Water/Foam Unit

Experience has shown that it is very valuable to have water available on the ATV during ignition operations. In addition to the utility of the water to control spot fires and provide extra protection for the operator, the added weight of the water serves as a counterbalance and negates the tendency of the ATV to rear up when running over small brush with all the weight on the rear of the vehicle. Several small electric water units are available through commercial suppliers. The units often are available through local agricultural cooperatives.

Recommendations were made for four items relating to the water/foam unit.

- Water. It is recommended that all ATVs with drip torch units carry a full 5-gallon bladder bag during ignition operations. A bladder bag is preferable for the flexibility it allows and they are readily available to all users.
- Pump. If using a water tank, an electric pump is recommended. The switch should be located within easy reach of the operator, preferably without leaving the seat.
- Hose. If using a water tank, a rubber hose at least 10 feet in length is recommended. Caution should be taken to avoid using a hose that is so long it could become entangled.
- Nozzle. It is preferable for the nozzle to be adjustable with a stream or spray.

Fire Extinguisher

Attachment 1 SAFETY AND AUXILARY EQUIPMENT

A minimum 2 ½ lb. BC type fire extinguisher will be mounted to be easy accessible on the front rack of the ATV.

Specialty Equipment

Of the various types of specialty equipment that are sometimes used, three are of particular interest.

- Winch. An electric or hand winch is recommended for the front of the ATV. This allows the operator to pull the machine out of a bog or off a hidden stump without calling for assistance and without the risk of back strain from trying to lift the machine. If the ATV is equipped with a winch it is recommended that the operator be trained in winch use and safety.

- Rat tail. The rat tail is a flexible metal fuel line 25 feet long with a wick at the end. The unit is designed to be pulled behind the ATV, with the actual ignition point at the end of the line. Early tests have shown that the unit is effective, but hanging up is a potential problem in certain vegetative types. The fuel line is equipped with a switch that shuts off the flow of fuel and a pop-loose connection should the line ever hang up. The advantage of the rat tail is to get the ignition point further away from the ATV, giving the operator extra flexibility and time should the ATV become immobilized.
- Spray boom. Some units have been equipped with a 5- to 6- foot wide spray boom to lay down a water or foam line before firing. This device has been most useful when mounted on a lightweight trailer pulled behind the ATV. Otherwise water tank capacity is very limited.

Maintenance

Frequent maintenance of both the ATV and the torch unit is needed. Two incidents during the past few years in which ATV units burned have been attributed to mechanical failure of the ATV in an active prescribed burn area with the torch not in use.

Recommendations were made for six items relating to maintenance.

- Frequency. ATV inspection and maintenance by a certified mechanic is recommended every 3 months for very heavy users and every 6 months for moderate to heavy users. The following items should be checked every day prior to use of the machine: tires, fluid levels, brakes, wiring, cables, and battery.
- Ignition device. Inspection should be made prior to any operation. After any operation, appropriate refurbishment and inspection should be performed on both ignition device and ATV. For the ignition device this includes all the valves, filters, lines, wiring and switches.
- Tire pressure. Increasing tire pressure by 5 pounds per square inch is recommended, due to weight and operating conditions.
- Spark plugs. With 2-cycle engines plugs may foul more frequently when the vehicle is operated at lower revolutions per minute. Plugs should be inspected and replace regularly. Spare plugs and a plug wrench should always be carried with the machine.
- Hour meter. If ATV is not equipped with an hour meter, it is recommended that one be added to facilitate tracking of maintenance items. For ATVs equipped with an hour meter, manufacturer specifications should be referenced to determine maintenance frequency.

- Radiator. Radiator fins, screens and the area between the radiator and skid plates can readily become clogged with debris including cattails, weeds and forest litter. This debris/litter is flammable and inhibits radiator performance.

Transportation

The two primary methods of transporting ATV's are on trailers and in the back of a pickup. Either is effective if appropriate safety measures are used.

Pickup Transport

Transporting the unit in the back of a pickup provides added flexibility as areas inaccessible to a trailer can be reached. Problems can occur with loading and off loading the unit. Occasionally an earth berm or ditch may be located to facilitate the loading. More often a pair of ramps are used.

- If ramps are used, it is recommended that a mechanism be devised to secure the ramps to the truck tailgate. Bolts, chains, or some other device that will not allow ramps to slip off the tailgate can be used.

Note: Several serious accidents have occurred from ATV and operator flipping over backwards when ramps are too steep. Consider alternative loading methods, such as attachment of torching or water equipment after the ATV is loaded or off loaded. The FMO and or burn boss should ensure safe loading operations and training is provided annually and during prescribed burning briefings.

Trailers

- Single and double trailers are both common. Trailers should be hauled with a standard ball hitch and should meet regulations for use on public roads. Wiring for taillights and brake lights should be in place. The tailgate of the trailer should fold down and form a ramp. Side rails are recommended.

Due to the weight involved, trailers used to haul more than one ATV unit at a time should be equipped with trailer brakes. Any extra fuel for burning or equipment carried on the trailers must be secured and be D.O.T. approved.

Tilt trailer use is discouraged.

Trailer/Pick Up Loading

Whether using a ramp or other method for loading or offloading, it is required that the operator wears a helmet that is approved by one of the following: ANSI-90, DOT, and SNELL M-95. SPH-4 or SPH-5 flight helmets are also appropriate.

Refer to: INTERAGENCY STANDARDS FOR FIRE AND FIRE AVIATION OPERATION NFES 2724 (RED BOOK)

- It is recommended that tanks be emptied prior to loading into pickup beds or high trailers due to weight and balance issues.

Tie-downs

- Whether a pickup or a trailer is used, the ATV unit must be securely tied down. Ratchet-type nylon straps are recommended. ATV brakes should also be locked during transportation, and the transmission should be in first gear.

Operator Safety Equipment

In order to give the operator the maximum protection, certain protective items will be provided.

Personal Protective Equipment

Attachment 1 PPE REQUIREMENTS
Attachment 1 PPE CHECKLIST

Standard fire-line protective gear will be worn at all times while operating the ATV torch. These items include:

- ✓ Nomex shirt and pants.
- ✓ 8-inch leather boots.
- ✓ Gloves.
- ✓ Eye protection if not using a helmet with a full face shield.
- ✓ Fire shelter. The fire shelter should be worn by the individual and not attached to the ATV.
- ✓ Hard hat. A hard hat may be used as substitute for a helmet during ignition operations. During loading/unloading and point-to-point operations a hard hat is not allowed.

Helmet

Refer to: INTERAGENCY STANDARDS FOR FIRE AND FIRE AVIATION OPERATIONS NFES 2724 (RED BOOK)

The helmet must be DOT, ANSI-90, SNELL M-95, SPH-4 or SPH-5. Full-face helmets have been recommended for maximum protection in mountainous terrain and while loading or off loading where the threat of a rollover is most serious. In flatter terrain, open-face helmets have proven to work better due to better visibility and increased operator comfort on warmer days.

Ignition Source

For personal safety in the event the operator needs to burn out a safety zone, the operator should carry an appropriate ignition device other than the attached torch.

Hand Tool

Attachment 1 SAFETY AND AUXILARY EQUIPMENT CHECKLIST

It is required that some type of scraping tool be carried on the ATV in case the operator gets into a shelter deployment situation. The tool must be securely mounted to the ATV where it will not hang up on brush. Tool type will be dependent upon fuel type.

Radio Communications

Attachment 1 COMMUNICATIONS EQUIPMENT
Attachment 1 PPE CHECKLIST

When helmet headsets are not available a portable radio carried in a chest pack is the best alternative. The chest pack makes the radio more audible than when it is carried on a belt at the waist.

An ATV torch should never be operated without radio communications between the operator and the burn boss or ignition boss.

Training

Attachment 1 OPERATOR TRAINING REQUIREMENTS
Attachment 1a STANDARD OPERATING PROCEDURES

Training of the operator is a key to avoiding hazardous situations, including immobilization and possible burn-over of the ATV. ATV operators must be qualified in accordance with 321 FW 1.17D. The burn boss and/or ignition boss will determine experience level required for operation of the ATV torch. Complexity of burn will be the primary factor for determining level of experience.

Operations: Prior to Burn

Attachment 1 PRIOR TO BURN

Reconnaissance. The burn area will be reconnoitered during burn prescription development to determine which areas are appropriate for use of ATV torch as the ignition source. In thick brush or other areas with access problems, the operator and ignition boss and/or burn boss should plan an ignition pattern that will allow for both safe egress for the ATV as well as accomplishing burn objectives.

Attachment 1b FWS JOB HAZARD ANALYSIS

Inspection. A complete inspection of the ATV, torch, water unit, fire extinguisher, and trailer will be preformed prior to moving the unit to the field.

Briefing. ATV safety and ATV torch operations will be a standard topic in the pre-burn briefing.

Communication. The ignition boss and/or burn boss will confirm that all resources have communication prior to ignition. This primarily involves assuring that radios are functioning properly and the correct frequencies have been programmed. The ATV operator should confirm that they can hear the radio over the sound of the ATV.

Operations: Firing Operations

Recommendations for two areas for special attention during the burn.

Attachment 1 FIRING OPERATIONS
Attachment 1 STUCK, STALLED OR ROLLED ATV
Attachment 1 TORCH CATCHES FIRE

- Fatigue. The ignition boss or burn boss should monitor operator fatigue and adjust ATV torch operation accordingly.
- Communication schedule. A regular schedule (such as every 10 minutes) should be established for communication check-in between the ATV torch operator and the ignition boss and/or burn boss.

Hazards during burn. A job hazard analysis will be completed prior to any ATV operations. When hazardous situations are identified during the planning of a burn, appropriate action should be taken, such as:

- ✓ Hazards should be addressed during briefing by the burn boss or ignition boss.
- ✓ Changing ignition to other methods, such as helicopter or hand torch.
- ✓ Changing the firing pattern or technique.
- ✓ Using two ATV's, one to serve as support, either by providing water/foam and/or navigation and scouting while the other is firing.
- ✓ Water supply. The water supply on the ATV unit should never be exhausted. Water on the ATV torch unit is for extinguishing fires on ATV and for operator safety. It is not a substitute for holding resources.
- ✓ Parking the ATV. When the operator dismounts the ATV in an area with active fire nearby, the ATV should be parked in the cold black or other safe area. When this is not possible, the ATV should be left with the engine running, the transmission in neutral and the parking brake set.

Operations: After the burn

Recommendations for two areas for special attention after the burn:

- Ignition operation should perform an after action review as outlined in the IRPG (Incident Response Pocket Guide).
- The ATV torch and ATV should be inspected and refurbished for the next shift.

All-Terrain Vehicle (ATV) Driptorch

Interim Requirements, Procedures, and Checklists

March 01, 2004

Attachment 1

Equipment Requirements

ATV Requirements

- Four to six wheels
- Cargo capacity adequate to carry torch, water/foam unit (if mounted) on front, and other equipment (see manufacturer's specifications) while keeping under the GVWR.
- Rack capacity adequate (see manufacturer's specifications)
- Heavy duty or puncture resistant tires

Torch Requirements

- All components compatible with diesel and gasoline
- Fuel tank pressure relief (vented tank)
- Wiring, if present, protected from abrasion
- Torch electrical controls centrally located within easy sight and reach of the operator while seated on ATV
- Fuel shut-off within reach of operator while seated on ATV

Auxiliary Equipment

- Fire extinguisher
  - Minimum 2 ½ lb. BC Type Extinguisher
  - Not mounted on torch
  - Mounted to be easily accessible on front rack of ATV

PPE Requirements

- Nomex shirt and pants
- 8" leather boots
- Leather or Nomex gloves
- Eye protection
- Fire shelter
- Protective headgear per agency requirements

Communications Equipment

- Working radio w/ earjack
- Extra batteries

Operational Requirements

Operator Training Requirements

- ATV Fundamentals
  - ATV training, as required by agency
  - Be familiar with operation of specific ATV and driptorch.
- Fire & prescribed burning qualifications
  - FFT 2 (Current red card)
- Annual Wildland Fire Safety Refresher Training

Prior to Burn

- ATV torch operator will recon burn area prior to ignition
- Perform complete inspection of ATV, torch, fire extinguisher, etc. (use check lists)
- Include discussion of ATV torch operations in pre-burn briefing
- Document ATV torch use in JHA (see attached templates for ATV torch JHA and SOP)

Firing Operations

- The firing boss/ignition specialist will not be a torch operator
- Change operators as needed to avoid fatigue
- Fueling torch
  - Ensure the wick is completely extinguished and cooled
  - Turn off ATV and allow to cool
  - No smoking or open flame within 50 feet
  - Use correct fuel mixture for conditions
  - Do not completely fill tank, fill to about 90% of tank capacity
  - Wipe up any fuel spilled on the tank or the ATV
- Close the torch fuel valve and extinguish the wick when not actively firing
- Watch out for fire burning under a lit wick when the ATV is stopped
- Always use safe firing practices
- Maintain a safe distance between ATVs when igniting to allow for reaction time if a problem develops
- Maintain continuous communication or visual contact with the operators on either side of you
- Maintain position and speed during ignition
- Never ignite when another ATV is directly downwind of you
- Never allow ignitions to trap other operators
- In thick brush or other areas with access problems the operator should ride in and ignite on the way out
- When the operator dismounts the machine in an active fire area:
  - Turn off the torch, extinguish wick
  - Park ATV in the black or other safe area

Emergency Procedures

"Provide for personal safety first"

Stuck, Stalled, or Rolled ATV

- Notify others of your situation
  - Halt further ignition
  - Extinguish wick
  - Request help

- Extinguish fire near machine using water tank (if mounted) or handtool

Torch Catches Fire

- Try to extinguish fire

If unable to extinguish fire:

- If practical, jettison driptorch and drive ATV away from torch .

- If torch cannot be jettisoned abandon ATV/torch and leave area immediately

- Notify others of your situation

Checklist

ATV Inspection Checklist (Pre operation)

- Maintenance schedule up to date
- Clean debris from undercarriage
- Fuel level
- Engine oil level
- Differential gear oil level and leakage
- Throttle cable operation
- Tire pressure
- Tire wear, cuts, and gouges
- Damaged rims
- Fitting and fastener tightness
- Lights
- Coolant level
- Hoses
- Automatic transmission fluids- if applicable
- Air filters
- Battery cable clamps and wires
- Rubber axle boots – damage, cuts, and leaks
- Engine stop switch stops engine
- Fuel tank valve lever in on position
- Suspension
- Front brake
  - Operation
  - Free play
  - Fluid level
  - Leaks
- Rear brake
  - Operation
  - Adjustment
- Wiring
- Cables

Checklist

Torch Inspection Checklist (Pre operation)

- Valves
- Filters
- Check all connections, including condition (fuel lines)
- Switches
- Torch is securely fastened to ATV
- Full tank
- Pump check
- Nozzle
- Igniter system
- Tank (cap tight, etc.)
- Fasteners
- Snuffer
- Spare fuses

Wiring and connections

Checklist

Safety and Auxiliary Equipment Checklist

- Fire Extinguisher
    - Minimum 2 ½ lb. BC Type Extinguisher
    - Not mounted on torch
    - Mounted to be accessible on front rack of ATV
- PPE
    - Nomex shirt and pants
    - 8” leather boots
    - Leather or Nomex gloves
    - Eye protection
    - Fire shelter
    - Protective headgear (per agency policy)
- Working radio w/ earjack
- Extra batteries

Fish & Wildlife Service Fire Program Management Standard Operating Procedures Attachment 1a		***Section:*** Wildland Fire Operations	***Revised***: 8/15/2005	***Number:***
	Subject: Operation of the ATV-mounted electric-powered "drip torch"			***Page:*** 1 of 3

I. Scope: This SOP applies to the use of the ATV-mounted electric-powered "drip torch". It applies to the use of the device, fuel mixing, safety-checks, and operator qualifications.

II. Purpose: To provide a safe and efficient working environment when using the device.

III. Procedure:

- **Training:** Each operator will be trained and certified by someone who is already qualified on the device. This training will consist of torch orientation and practical field operation training elements. Operator will be certified to operate an ATV in accordance with agency policy before riding an ATV.
- **Fuel mixing:** The correct fuel mixture for the refuge's ATV mounted torch is 1 part gasoline and 3 parts diesel fuel. Ideally fuel will be mixed before adding it to torch. Diesel should be placed in mixing container first and followed with appropriate amount of gasoline fuel for proper ratio. This will allow for complete mixing of two fuels.
- **Tank filling:** Do not fill the tank full. This may cause the tank to pressurize and cause fuel to spurt out of the wand even if the pump is not running.
- **Off road driving:** This will be governed by the specific regulations in each land management area, but generally driving more than a few feet away from a road or trail will be minimized. The Ignition Specialist will give direction on exactly where the ATV with the device should be driven.
- **Wind direction:** Lighting with the direction of the wind is to generally be avoided yet is possible with the increased speeds possible with ATV operations. Great care will be practiced when igniting with the device when traveling *with* the wind. The operator should be aware that it is possible for the wind to blow fuel from the wick towards the ATV. The likelihood of becoming trapped by your own fire is also increased and extreme care must be exercised with this operation.
- **Becoming Trapped:** It is possible, when igniting, to arrive at a barrier that the ATV is not able to cross, such as a ditch or log. This could create a problem with fire blocking the only escape route. Before the use of the device, the operator should scout with the ATV the area proposed for ignition to determine safe and accessible routes. The operator will be vigilant to foresee possible entrapment sites. If the ATV does become entrapped, he or she shall not hesitate to abandon it and move into a safety zone. It is critical that the operator does not rely on the ATV as a means to escape a fire.
- **Cargo:** No additional flammable liquids will be carried on the ATV while operating the ATV drip torch device. For example, cans of torch mix and gasoline will not be carried in the cargo racks. Extra torch mix may be cached nearby in the black or other safe location.

- **Fueling the torch**
    - When fueling the torch, ensure that you are well away from all possible ignition sources. Fill the tank as you would a drip torch except make sure that the drip torch unit and the ATV's engine are off. Avoid spilling fuel.
    - The ATV's fuel tank will be checked each time the torch is refueled. Fill the ATV's fuel tank at the same time as you are filling the drip torch, to avoid running out of fuel during ignition operations.
    - Check the torch closely for fuel leaks.
    - Clean up all fuel spills on the torch or ATV before resuming firing operations.
- **Familiarization with the drip torch**
    - The operator should be familiar: turning the torch on and off; extinguishing the wick; what to do in the event of an Emergency; how to quickly remove the torch unit from the ATV (if equipped with an ejector spring); the location of the fire extinguisher, how it detaches from its mount, and how to operate it.
    - Before beginning ignition operations the user should ensure proper set-up of the torch and test to see that it dispenses fuel properly. Check that the electrical switch works properly.
- **Pre-use check list**
    - Check all electrical connections and wiring between torch and ATV and at torch switch.
    - Check all fasteners that attach torch to ATV rack and ATV rack to ATV to ensure that they are in place, tight, and good working order
    - Check fire extinguisher fasteners and if it is fully charged.
    - Check torch ignition system for excessive carbon buildup, loose parts, and damage.
    - Check that all parts of the torch are tight and in good working order.
    - Check torch for any leaks including that the cap is well sealed.
    - Ensure that fuel supply connections are tight and are not damaged or leaking.
    - Check that torch jettison system is working and that all of it parts are properly installed.
    - Perform complete ATV check to include tire pressure and fuel level on ATV.
    - Ensure that torch operator is briefed.
- **Operating the Torch**
    - Decide how you are going to burn: if you are going to burn using the local or remote fuel delivering methods, depending on what fuels you are in, etc. Turn the selector knob on top of the tank to the desired setting.
    - When you are inside of the burn unit ready to begin, switch the handlebar toggle switch on to deliver fuel to the wick, soak the wick, and shut the switch off.
    - Light the wick when you are ready to commence your burn pattern. Turn the switch for the pump on and begin driving your pattern.
    - If you have a problem where you need to jettison the tank and torch, use the quick release mechanism and pull away from the tank.
- Fire Extinguisher—A fire extinguisher, minimum 2 ½ lb. BC type extinguisher, must be carried on the front rack of the ATV.
- Emergency Procedures
    - The ATV and its torch are not worth injury or risk of life. Get away from the ATV if has become a hazard to the operator.

- If the torch catches fire use the quick release mechanism to remove it from the ATV and drive away from it. It is possible that the torch may remain attached to the ATV by the electrical connection but driving away should break this connection.
- If the ATV catches fire apply the torch quick release mechanism and use the fire extinguisher to extinguish the fire in a safe area. It is not expected that the fire extinguisher will extinguish a well established fire but can catch a fire early. If the fire extinguisher is not effective move away from the ATV to a safe area and inform the ignition specialist of your situation.

Things to Remember

- You will be a certified ATV rider and approved to run the torch.
- Have the permission of the Ignition Specialist and get approval for which firing method you plan to use.
- You now have fire behind you. Do not stop too long.
- Look ahead. You need to be able to get out of where you drive into. You may not be able to back out of a situation because of fire behind you.
- Stay within the burn unit if the wick is lit. There may still be torch fuel in the fuel line, which can flow out the end.
- Know your ignition pattern before you start and make sure the Ignition Specialist, Burn Boss, others know it too. You do not want to trap folks in the interior of the burn. Stay in communications with all adjoining forces while burning.
- You can put a lot of fire on the ground in a short amount of time.
- Watch out for obstacles in your path. You do not want to get high-centered on an obstacle and be unable to get off of it.

Fish & Wildlife Service

JOB HAZARD ANALYSIS

JOB TITLE: ATV TORCH OPERATION DATE:

JOB LOCATION: PAGE 1 OF 1

KEY STEP	HAZARD (S)	SAFETY PROCEEDURES	RESPONSIBILITY
FILLING DRIP TORCH	FUEL SPILLS	WEAR PPE, USE SAFETY CANS WITH POUR SPOUTS, KNOW PROPER RATIO FOR ATV TORCH	ATV TORCH OPERATOR
ASSEMBLING DRIP TORCH	FUEL SPILLS, BREATHING FUEL VAPORS, SPILLED FUEL ON SKIN, HEAVY	WEAR PPE, CHECK FOR FUEL LEAKS, AVOID BREATHING FUMES, ENSURE SAFETY RELEASE IS WORKING PROPERLY, NOT CAUGHT ON ANYTHING	ATV TORCH OPERATOR
IGNITION OF DRIP TORCH	BURNS, FUMES, NOXIOUS SMOKE	WEAR PPE, ALERTNESS TO WICK LOCATION, USE PROPER TORCH IGNITION METHODS, AVOID BREATHING FUMES, ATV TORCH IS HARDER TO LIGHT THAN REGULAR DRIP TORCH, ASK HOW	ATV TORCH OPERATOR
BURNING OPERATIONS	BURNS, FUMES, NOXIOUS SMOKE	WEAR PPE, ALERTNESS TO WICK LOCATION, ALERTNESS TO LIGHTED FUEL FROM TORCH, KNOW IGINITION SEQUENCE BEFORE STARTING, ALWAYS HAVE A WAY OUT, WATCH YOU SPEED AND OBSTACLES, AVOID BREATHING FUMES, BE AWARE OF WHERE THE FIRE IS BURNING AND WHERE YOU ARE DRIVING	ATV TORCH OPERATOR
EXTINGUISHNG TORCH	BURNS, FUMES, NOXIOUS SMOKE	WEAR PPE, USE PEOPER EXTINGUISHMENT TECHNIQUES, AVOID BREATHING FUMES, ATV TORCH HARDER TO EXTINGUISH THAN REGULAR TORCH	ATV TORCH OPERATOR
REFUELING DRIP TORCH	BURNS, FUEL SPILLS, FUEL ON SKIN, BREATHING FUEL VAPORS	WEAR PPE, AWARENESS TO HOT WAND, USE SAFETY CANS WITH POUR SPOUTS, AVOID BREATHING FUMES, PLAN ON WHERE YOU WILL REFUEL BEFORE NEEDING TO REFUEL	ATV TORCH OPERATOR
STORAGE	BURNS, FUEL SPILLS, FUEL ON SKIN	WEAR PPE, ALERTNESS TO HOT WAND, CLOSE BRESTHER TUBE, INSTALL WAND PLUG, TIGHTEN LOCKING RING, LOOK FOR FUEL LEAKS, STORE UPRIGHT	ATV TORCH OPERATOR
ATV OPERATION	HAZARDOUS WHEN NOT OPERATED CORRECTLY	ONLY OPERATED BY QUALIFIED ATV OPERATOR WITH KNOWLEDGE OF ATV TORCH OPERATIONS	ATV TORCH OPERATOR
			Attachment 1b